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**SPI LLD**

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## Release Notes

Applies to Product Release: 01.00.00.16  
Publication Date: Sep 30, 2019

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### Contributors to this document

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# SPI LLD version 01.00.00.16

## Overview

This document provides the release information for the latest SPI Low Level Driver which should be used by drivers and application that interface with MCSPI/QSPI IPs.

SPI LLD module includes:

- Compiled library of SPI LLD.
- Source code.
- API reference guide

## LLD Dependencies

LLD is dependent on following external components delivered in PDK package:

- CSL

## New/Updated Features and Quality

### Release 1.0.0.15:

IR #	Description
<a href="#">PRSDK-4453</a>	Added SMP support

### Release 1.0.0.14:

IR #	Description
PRSDK-4069	Support XIP mode in OSPI driver

### Release 1.0.0.13

REQ #	Description
	eSPI firmware support

### **Release 1.0.0.12**

REQ #	Description
PRSDK-2321	OSPI: Support indirect access mode and polling mode
PRSDK-2319	McSPI LLD: support fifo mode
PRSDK-2315	McSPI LLD: support interrupt mode
PRSDK-2322	OSPI: Support octal transfer

### **Release 1.0.0.9**

REQ #	Description
<a href="#">PRSDK-3190</a>	Added AM574x support
-	Fix for MCSPI test on K2-HS
PRSDK-3120	Migration to gcc 6.3.1

### **Release 1.0.0.8**

REQ #	Description
PRSDK-2988	RTOS: add 16-bit word length support for Keystone SPI LLD

### **Release 1.0.0.7**

<b>REQ #</b>	<b>Description</b>
PRSDK-1102	TI RTOS SPI: SPI DMA Mode Support for Keystone
PRSDK-2131	PDK support for DRA72x

### **Release 1.0.0.6**

<b>REQ #</b>	<b>Description</b>
PRSDK-1518	Add OMAPL137, OMAPL138 & C6748 support
PRSDK-2063	Disabled profiling utils library references on OMAPL13x platform
PRSDK-1462	QSPI support on DRA75x platform
PRSDK-1901	OSAL C66x lib in processor SDK to be enhanced to have Event Combiner APIs
PRSDK-1457	McSPI RTOS: Support all four chip select per instance
PRSDK-1090	TI RTOS SPI: Common library between DMA and non-DMA mode
PRSDK-696	TI RTOS: McSPI EDMA: Enable fifo trigger lever support for both rx and tx
PRSDK-998	McSPI RTOS: TCS (Chip-select time control) parameter of McSPI IP present in MCSPI_CHxCONF should be exposed in interface
PRSDK-999	TI RTOS SPI: Parameter to control McSPI init delay
PRSDK-1577	Remove unwanted delays in TI RTOS Drivers and Examples to improve robustness - McSPI
PRSDK-1091	TI RTOS SPI: TX/RX always assumes 8-bit data
PRSDK-1085	K2G SPI LLD Slave mode support

### **Release 1.0.0.5**

<b>REQ #</b>	<b>Description</b>
PRSDK-44	Add iceK2G support
PRSDK-1444	Add DRA75x support
PRSDK-1297	Add DRA78x support

### **Release 1.0.0.4**

<b>Requirement Number</b>	<b>Description</b>
<b>PRSDK-1089</b>	To add SPI get/set SOC API for TDA devices

### **Release 1.0.0.3**

- DAL implementation corresponding to Keystone devices is relocated to CSL directory.
- DAL implementation corresponding to AM devices is reused from the CSL-FL.
- All the examples/test project bios config files are updated to include CSL library.

### **Release 1.0.0.2**

- Added LLD support for K2G
- Added A15 test/example support for K2L/K2E
- Added LLD support TDA2ex/TDA2xx/TDA3xx and mcspi master mode transfer example
- Cleaned up bios config file for AM572x/AM571x/AM437x/AM335x
- Fixed Klocwork/Misra-C compilation warnings
- Added edma support for MCSPI in IP v1 driver
- Added slave mode support for MCSPI in IP v1 driver

### **Release 1.0.0.1**

- Added C66 SPI lib and test/example support for Keystone II
- Added A15 SPI lib and test/example support for K2HK
- Added SPI lib and test/example support for Keystone I
- Added QSPI test/example for SK AM437x
- Added M4 support for AM571x and AM572x
- Fixed Klocwork/Misra-C compilation warnings

- Added benchmarking support

This is an **engineering release**, tested by the development team for early integration effort

**Release 1.0.0.0**

- Initial release of low level driver
- Following IRs have been raised
  - **SDOCM00114858 - EDMA Support for SPI Driver to be added.**

**Resolved Incident Reports (IR)**

**Release 1.0.0.16:**

<b>IR #</b>	<b>Description</b>
PRSDK-5307	SPI Transfer Cancel implementation in SPI V0 Driver
PRSDK-6285	fix McSPI master/slave example baremetal build error
PRSDK-6233	Enabling all cores for j7
PRSDK-5466	fix issue OSPI driver re-open() fails on XIP mode
PRSDK-6469	Undefined the SPI_MASTERONLY_TESTS macro
PRSDK-6349	fix Misra-C issues
PRSDK-7104	fix a bug in indac and dac dma mode

**Release 1.0.0.15:**

<b>IR #</b>	<b>Description</b>
PRSDK-5559	fix QSPI clock prescaler configuration problem
PRSDK-4085	Add j721e_evm build support
PRSDK-5539	Fix SPI Rx interrupt trigger delay
PRSDK-5717	Multi/Single Channel is enabled in slave mode which is applicable only in master mode
PRSDK-5716	SPI Data pin direction is not configurable in slave mode
PRSDK-5718	SPI Channel should be enabled first before setting up FIFO
PRSDK-5872	fix the OSPI Bios test example hangup problem
PRSDK-5745	fix R5 PMU counter roll over issue

**Release 1.0.0.14:**

<b>IR #</b>	<b>Description</b>
PRSDK-5273	RTSC dependencies added
PRSDK-5029	Corrected the placement of QSPI flash dummy read cycles
PRSDK-3586	J7 to J721E
PRSDK-5265	fix issue in INDAC mode with interrupt enabled
PRSDK-5275	add 166MHz RCLK test cases for automation
PRSDK-5094	add dma support for QSPI IP v1 driver
PRSDK-3715	Migrate to new CSL SOC alias change
PRSDK-1256	add timeout support for polled mode SPI/McSPI transaction
PRSDK-5373	Enabled DMA mode support for OMAPL13x

**Release 1.0.0.13:**

<b>IR #</b>	<b>Description</b>
PRSDK-4328	Updated SPI V0 and V1 drivers to close the current transfer and return TIMEOUT status, in case of SPI timeout
PRSDK-2321	enable Indirect Access Controlller test case with polling mode
PRSDK-2319	fix loopback issues in DMA FIFO mode
PRSDK-4051	fix OSPI DMA read issue
PRSDK-4520	fix OSPI DAC write issue
PRSDK-4123	Aligning test names for am65x to that of other SOCs
PRSDK-4525	add McSPI/OSPI test/example support on am65xx-idk platform
PRSDK-4696	fix MCSPI_BasicExample M4 test failure
PRSDK-4765	am6: fix DMA loopback test issue
PRSDK-4050	add high speed mode support
PRSDK-4328	Added delay before Timeout test case to allow master to complete its last transfer
PRSDK-4798	fix master slave example build issue for k2g
PRSDK-4772	fix ospi indac mode issue
PRSDK-4960	add OSPI read/write performance measurement support
PRSDK-4169	Adding sciclient as a dependency for board
PRSDK-4169	Removed duplicate sciclient inclusion
PRSDK-5050	fix an issue of DMA transfer with more than 64KB
PRSDK-4456	Updated SPI V0 driver to support the SPI clock modes 2 and 3
PRSDK-297	Fix Example warning for AM57xx platform
PRSDK-5060	Removed redundant package inclusion in the configuration files
PRSDK-2892	Added Non-executable flag to device peripheral memory MMU config
PRSDK-4704	Increaseing the MPU region size to 32K

PRSDK-4454	Removed source files inclusion for Doxygen

**Release 1.0.0.12:**

<b>IR #</b>	<b>Description</b>
PRSDK-2019	Remove Board specific header files from SPI LLD examples
PRSDK-4328	SPI Timeout Test case fails
PRSDK-4520	RTOS: OSPI and OSPI DMA MPU unittests fail
PRSDK-4051	RTOS: K3: OSPI dma read test failed
PRSDK-3669	C++ build failure for PDK LLD components

**Release 1.0.0.11:**

<b>IR #</b>	<b>Description</b>
PRSDK-2194	Added RULES_MAKE macro
PRSDK-3018	RTOS: create SPI loopback unit test examples
PRSDK-3030	Fix for OMAPL137 DSP interrupt issue
PRSDK-3865	SPI driver doesn't support timeout

**Release 1.0.0.10:**

<b>IR #</b>	<b>Description</b>
PRSDK-2819	Networking API header files are not compatible with C++
PRSDK-3471	PDK: unresolved symbols Compilation failure on AM5 platforms
PRSDK-3040	OMAPL138 DSP example app execution fails when booting from SD card
PRSDK-3578	QSPI test case fails for higher transfer length and duplicates flash driver files.
PRSDK-3608	QSPI test failure
PRSDK-3579	Clean up static analysis error in UART/SPI LLD
PSDKRA-108	DRA78x build errors for all CCS examples
PSDKRA-54	Refactor pad configuration sequence

**Release 1.0.0.8:**

<b>IR #</b>	<b>Description</b>
PRSDK-2460	RTOS AMIC110: add missing applicable LLD projects
PRSDK-2867	SPI pinmux SLEWCONTROL configuration issue in LLD tests
PRSDK-2640	RTOS: DSP SPI_BasicExample_ExampleProject fails with no messages printed to UART

**Release 1.0.0.7:**

<b>IR #</b>	<b>Description</b>
PRSDK-1606	RTOS: SPI Slave/Master unit-test for ARM fails on AM335-ICE/BBB & AM437x-IDK
PRSDK-1929	MCSPi DMA mode does not work in slave mode
PRSDK-2071	Fix Misra-C/KlocWork errors in i2c/gpio/uart/spi LLD
PRSDK-2213	GPIO/McSPi/I2C LLD PDK idkAM571x test/examples use wrong board name in the bios config file
PRSDK-2377	K2G PDK: SPI LLD does not return error information to application
PRSDK-2378	K2G PDK: SPI LLD all Frame Format (Polarity, Phase) is not working
PRSDK-2459	OMAPL13x Board library update for Ethernet PHY specific configurations
PRSDK-2473	RTOS: DSP SPI_LoopbackExample_ExampleProject fails with no messages printed to UART
PRSDK-2493	K2G PDK: SPI LLD polarity 1 clock mode is not working

**Release 1.0.0.6:**

<b>IR #</b>	<b>Description</b>
PRSDK-2101	K2G: MCSPI SlaveMode unit tests do not build
PRSDK-1901	ECM *.cfg file fixes
PRSDK-563	fix QSPI reads incorrectly when booted in QSPI-96 mode
PRSDK-2053	fix MCSPI_SerialFlash_Dma_evmAM335x_armTestProject failure
PRSDK-2005	MCSPI:BasicExample_Example failed on am572x-idk platform
PRSDK-1718	QSPI LLD: Flash 4-byte addressing does not work
PRSDK-1917	fix MCSPI_BasicExample_Dma_TestProject fail issue
PRSDK-776	Check for DATA_SECTION, DATA_ALIGN applicable for M4 and GCC and make appropriate changes
PRSDK-1945	mcspi loopback test build failure
PRSDK-1446	LLD test/example should not include board specific board_cfg.h
PRSDK-2078	BasicExample_TestProject failed on am335x-ice platform

**Release 1.0.0.5:**

<b>IR #</b>	<b>Description</b>
PRSDK-1179	SPI LLD: DMA driver fails to invoke call back function in CALLBACK mode
PRSDK-1634	McSPI main test/example failed in the nightly

**Release 1.0.0.4:**

<b>IR Parent/ Child Number</b>	<b>Severity Level</b>	<b>IR Description</b>
<b>PRSDK-793</b>	Major	TDA file filtering in RTOS makefiles
<b>PRSDK-880</b>	Major	Makefile infrastructure is not able to limit the application build for a given evm
<b>PRSDK-803</b>	Major	Move common makefile rules to infrastructure

IR Parent/ Child Number	Severity Level	IR Description
<b>PRSDK-839</b>	Major	klocwork bug introduced due to version update from 10.2.1 to 11.1.0
<b>PRSDK-781</b>	Major	Klocwork report for TI RTOS drivers : UART, I2C, SPI, McASP and MMCSD
<b>PRSDK-534</b>	Major	SF25FL_bufferWrite/Read takes long time to execute
<b>PRSDK-871</b>	Major	ARM MCSPI_BasicExample_Dma_TestProject fails on AM571x-IDK
<b>PRSDK-841</b>	Minor	ARM MCSPI_BasicExample_Dma_TestProject fails on AM571x-IDK
<b>PRSDK-1058</b>	Minor	SPI Driver: get rid of the TBC/TBD and #if 0's.
<b>PRSDK-1167</b>	Major	SPI_BasicExample DSP LE tests failed on K2G platform

## Known Issues/Limitations

IR Parent/ Child Number	Severity Level	IR Description
PRSDK-1606	Major	RTOS: SPI Slave/Master unit-test for ARM fails on AM335-ICE/BBB & AM437x-IDK
PRSDK-3030	Major	SPI interrupt mode is not working on OMAPL13x DSP core

## Licensing

Please refer to the software Manifest document for the details.

## Delivery Package

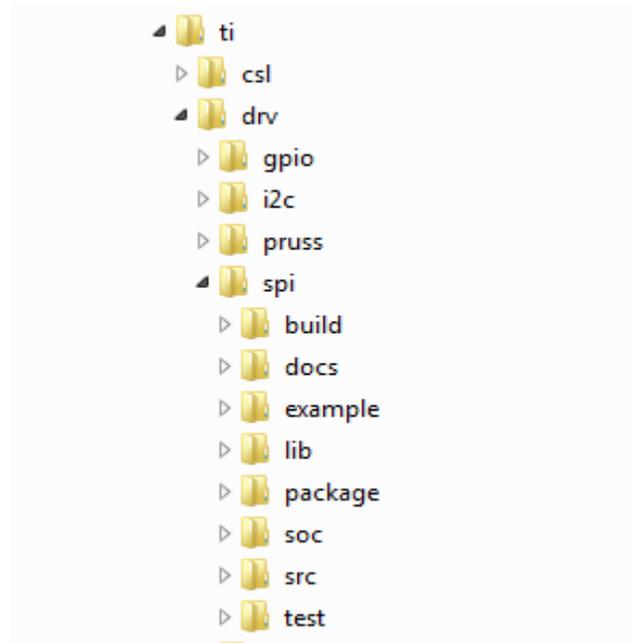
There is no separate delivery package. The SPI LLD is being delivered as part of PDK.

## Installation Instructions

The LLD is currently bundled as part of Platform Development Kit (PDK). Refer installation instruction to the release notes provided for PDK.

## Directory structure

The following is the directory structure after the SPI LLD package has been installed:



The following table explains each individual directory:

Directory Name	Description
ti/drv/spi	The top level directory contains the following:- <ol style="list-style-type: none"> <li><u>XDC Build and Package files</u> These files (<code>config.bld</code>, <code>package.xdc</code> etc) are the XDC build files which are used to create the SPI package.</li> <li><u>Exported Driver header file</u> Header files which are provided by the SPI low level driver and should be used by the application developers for driver customization and usage.</li> </ol>
ti/drv/spi/build	The directory contains internal XDC build related files which are used to create the SPI low level driver package.
ti/drv/spi/docs	The directory contains the SPI low level driver documentation.
ti/drv/spi/example	The “example” directory in the SPI low level driver has the examples demonstrating the usage of SPI driver.
ti/drv/spi/lib	The “lib” folder has pre-built Big and Little Endian libraries for the SPI low level driver along with their <u>code/data size information</u> .
ti/drv/spi/package	Internal SPI low level driver package files.
ti/drv/spi/soc	This directory contains SoC specific files.
ti/drv/spi/src	Source code for the SPI low level driver.
ti/drv/spi/test	The “test” directory in the SPI low level driver has test application which

is used by the development team to test the SPI low level driver.

## Customer Documentation List

Table 1 lists the documents that are accessible through the **/docs** folder on the product installation CD or in the delivery package.

**Table 1 Product Documentation included with this Release**

Document #	Document Title	File Name
1	API documentation (generated by Doxygen)	docs/spilldDocs.chm
2	Release Notes	docs/ReleaseNotes_SPI_LLD.pdf
3	Software Manifest	docs/SPI_LLD_SoftwareManifest.html